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BUILDINGS AND BUILT ENVIRONMENT

Avant Homes
Hay Green Lane
Birdwell
Lighting Impact Assessment

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1. INTRODUCTION

Instruction

1.1 BWB Consulting Limited (BWB) was instructed by Avant Homes (the Client) to undertake a lighting impact assessment to support the planning application for a proposed residential development at Hay Green Lane, Birdwell ('the Site').

Proposed Development

1.2 The proposed development comprises the construction of 113 residential properties with associated landscaping and site infrastructure.

1.3 The Proposed Development Masterplan is included within **Appendix 1**.

Objectives

1.4 This report has been produced to identify the proposed lighting strategy and subsequent impact of the external lighting installation on the existing site environment and the wider locality.

1.5 A lighting installation is required to enable users to operate safely and reduce the fear of crime. Lighting is needed for both pedestrians and vehicle drivers. For pedestrians, lighting for good viewing conditions and avoidance of dark areas is necessary. For vehicle drivers the emphasis is on good lighting for vehicle movement and use of roads.

1.6 This report reviews the potential effects of new lighting and reviews methods of lighting the proposed external areas while limiting potentially obtrusive effects to receptors that may have a negative response to a change in their lighting condition. Nearby residential properties and wildlife / habitat which are found on, near or utilising the site are typical receptors considered for analysis.

Scope of Works

1.7 The Scope of work includes:

- Identification and assessment of receptors and their sensitivity.
- Identification of required / anticipated lighting provisions for the proposed development; and
- Assessment of the potential effects created by a new lighting strategy with respect to the baseline condition.

2. RELEVANT POLICY AND GUIDANCE

International guidance

Commission Internationale De L'Eclairage (CIE 150)

2.1 The purpose of this guide is to help formulate guidelines for assessing the environmental effects of outdoor lighting and to give recommended limits for relevant lighting parameters to contain the obtrusive effects of outdoor lighting within tolerable levels. As the obtrusive effects of outdoor lighting are best controlled initially by appropriate design, the guidance given is primarily applicable to new installations; however, some advice is also provided on remedial measures which may be taken for existing installations. This guide refers to the potentially adverse effects of outdoor lighting on both natural and man-made environments for people in most aspects of daily life, from residents, sightseers, transport users to environmentalists and astronomers.

Guidelines for Minimising Sky Glow (CIE 126)

2.2 These guidelines prepared by Commission Internationale De L'Eclairage provide general guidance for lighting designers and policy makers on the reduction of sky glow. The report gives recommendations about maximum permissible values for lighting installations. These values must be regarded as limiting values. Lighting designers should seek to meet the lowest specifications for the design. Other uses of the open air areas at night will usually result in less stringent sky-glow requirements. Practical implementation of the general guidance is left to National Regulations.

National guidance

National Planning Policy Framework (2021)

2.3 The Revised National Planning Policy Framework (NPPF) provides guidance relating to planning and pollution control for new development in England. The purpose of the planning system is to contribute to achievement of sustainable development. In relation to lighting, Paragraph 185 states: "Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation"

DEFRA's Lighting in the Countryside: Towards Good Practice (2001)

2.4 The Office of the Deputy Prime Minister (ODPM – now Department for Communities and Local Government) in conjunction with the Countryside Commission published 'Lighting in the Countryside: Towards Good Practice' in July 1997, and a revised issue in 2001. The guidance was developed to 'provide practical advice on the prevention and control of lighting effects through appropriate action by all those involved with lighting in the countryside'. Its objective is 'to identify good practice in the planning and design of lighting in rural areas; and advise on how it can be achieved, using case study examples'. The guide aims to provide an overview and common understanding of all aspects of good lighting practice stating that close co-operation and participation is

required for all those involved in planning, designing and installing lighting schemes. The guidance provides valuable information on lighting best practice and the standard methodology outlined in this guidance document has been followed as part of this assessment. Whilst the guidance relates to 'lighting in the countryside', it is considered best practice to adopt many of the principles contained within the guidance to sites of a more urban nature.

Institute of Lighting Professionals (ILP) Guidance Notes for the Reduction of Obtrusive Light (2021)

2.5 The ILP has proposed lighting guidance and criteria for local authorities with a recommendation that they are incorporated at the local plan level. The guidance defines various forms of light pollution and describes a series of environmental zones (similar to the CIE 150 environmental zones). The ILP guidance provides suitable criteria against which the effects of artificial lighting can be assessed and is used in this assessment.

2.6 The ILP Guidance Notes recommends that the immediate environment is classified systematically as shown in **Table 1**. ILP Guidance Notes then make recommendations for limiting obtrusive light according to the environmental zone in which the lighting would be situated. The stringency depends on the capacity to absorb lighting effects, with Zone E0 requiring the strictest level of control and E4 the lowest.

Table 1. Environmental Zones

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres with high levels of night- time activity

2.7 For each Environmental Zone, recommended obtrusive light limits for exterior lighting installations have also been determined. These are summarised in **Table 2.**

Table 2. Obtrusive Light Limitations for Exterior Lighting Installations

Light Technical Parameter	Application Conditions	Environmental Zones				
		E0	E1	E2	E3	E4
Illuminance in the vertical plane (E_v)	Pre-curfew	n/a	2 lx	5 lx	10 lx	25 lx
	Post-curfew	n/a	<0.1 lx	1 lx	2 lx	5 lx
Upward light ratio (ULR) %		0	0	2.5	5	15

Institute of Lighting Professionals (ILP) Guidance Note 08 for Bats and artificial lighting in the UK (2018)

2.8 This document is aimed at lighting professionals, lighting designers, planning officers, developers, bat workers/ecologists and anyone specifying lighting. It is intended to raise awareness of the impacts of artificial lighting on bats, and mitigation is suggested for various scenarios. The Guidance Note provides recommendations for appropriate external lighting specification:

- All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used.
- LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (ideally <2700 Kelvin) should be adopted to reduce blue light component.
- Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Column heights should be carefully considered to minimise light spill.
- Only luminaires with an upward light ratio of 0% and with good optical control should be used.
- Luminaires should always be mounted on the horizontal, ie no upward tilt.
- As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

British Standards

BS 5489: Code of Practice for the Design of Road Lighting – Part 1: Lighting of Roads and Public Amenity Areas (2020)

2.9 BS 5489-1 provides recommendations on the general principles, aesthetic and technical aspects of road lighting and advises on statutory provisions, operation and maintenance of lighting. The standard provides recommendations for the design of lighting for all types of highways and public thoroughfares, including those specifically for pedestrians and cyclists, and for pedestrian subways and bridges.

2.10 **Table 3** is taken from BS 5489-1 which helps to define the lighting class for subsidiary roads (Class P – subsidiary roads including residential roads). The required lighting performance criteria for each class is defined in BS EN 13201 Part 2: Road Lighting Performance Requirements (2015).

Table 3. Lighting classes for subsidiary roads

Traffic flow	Lighting class		
	E1 to E4 A)	E1 to E2 A)	E3 to E4 A)
	Pedestrian and cyclists	Speed limit <30mph	Speed limit <30mph
Busy B)	P5	P4	P3
Normal C)	P5	P5	P4
Quiet D)	P6	P5	P4

A) Environmental zone, as given in ILP Guidance Notes (refer to **Table 1**).

B) Busy traffic flow refers to areas where the traffic usage is high and can be associated with local amenities such as clubs, shopping facilities, public houses, etc.

C) Normal traffic flow refers to areas where the traffic usage is of a level equivalent to a housing estate access road.

D) Quiet traffic flow refers to areas where the traffic usage is of a level equivalent to a residential road, and is mainly associated with the adjacent properties or properties on other equivalent roads accessed from this road.

BS EN 13201 Part 2: Road Lighting Performance Requirements (2015)

2.11 This standard defines lighting classes for road lighting according to photometric requirements and aiming at the visual needs of road users. It also considers environmental aspects of road lighting.

2.12 **Table 4** is taken from BS EN 13201-2 which defines the lighting performance requirements for Class P roads.

Table 4. P Lighting class performance requirements

Class	Horizontal illuminance	
	Maintained average (Lux)	Minimum (Lux)
P1	15.0	3.0
P2	10.0	2.0
P3	7.5	1.5
P4	5.0	1.0
P5	3.0	0.6
P6	2.0	0.4

Local guidance

Barnsley Local Plan (Adopted January 2019)

2.13 This document provides local planning policy for the future development of Barnsley up to the year 2033. The Local Plan sets out the key elements of the planning framework for Barnsley, and the approach to its long term physical development to achieve the Council's vision of what sort of place Barnsley wants to become.

2.14 **Policy GD1** (General Development) states that proposals for development will be approved if:

- "There will be no significant adverse effect on the living conditions and residential amenity of existing and future residents;

- They will not adversely affect the potential development of a wider area of land which could otherwise be available for development and safeguards access to adjacent land;
- They include landscaping to provide a high quality setting for buildings, incorporating existing landscape features and ensuring that plant species and the way they are planted, hard surfaces, boundary treatments and other features appropriately reflect, protect and improve the character of the local landscape;
- Any adverse impact on the environment, natural resources, waste and pollution is minimised and mitigated;"

2.15 **Policy Poll1** (Pollution Control and Protection) states the following:

- "Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air, surface water and groundwater, noise, smell, dust, vibration, light or other pollution which would unacceptably affect or cause a nuisance to the natural and built environment or to people.
- We will not allow development of new housing or other environmentally sensitive development where existing air pollution, noise, smell, dust, vibration, light or other pollution levels are unacceptable and there is no reasonable prospect that these can be mitigated against.
- Developers will be expected to minimise the effects of any possible pollution and provide mitigation"

Ecologist Guidance

Ecological Appraisal (May 2020)

2.16 This report provides an Ecological Appraisal of the Site and states the following:

2.17 In order to avoid indirect impacts of light spill to tree T2, the guidance for a sensitive lighting scheme as detailed below should be implemented.

- "Illumination either of external lighting or light spill from the development may impact on bats commuting and foraging along the retained site boundaries, and newly-created habitats. The lighting and layout of the proposed development will be designed to minimise light-spill onto habitats both within and adjacent to it that are used by the local bat population foraging or commuting. This will be achieved by ensuring that the design of lighting is based upon guidelines presented in the Bat Conservation Trust and Institution of Lighting Professionals Guidance Note 08/18 'Bats and artificial lighting in the UK-Bats and Built Environment Series', the Bat Conservation Trust & Institute of Lighting Engineers 'Bats and Lighting in the UK-Bats and Built Environment Series', the Bat Conservation Trust 'Artificial Lighting and Wildlife Interim Guidance 'and the Bat Conservation Trust 'Statement on the impact and design of artificial light on bats'. Therefore, the lighting scheme will include the following:
    - The strategic use of landscaping and planting to avoid light spill on sensitive habitats. New woodland planting will buffer the north, south and east retained boundaries to create dark corridors around the site;
    - The avoidance of direct lighting of existing trees, scrub, woodland, or proposed areas of habitat creation / landscape planting;

- Unnecessary light spill will be controlled through a combination of directional lighting, low lighting columns, hooded / shielded luminaires or strategic planting;
- All new column mounted car park luminaires shall be fitted with flat glass where appropriate to aid 0% upward light discharge;
- Where appropriate, luminaires on the site boundary will be fitted with light baffles to prevent light spill.

- It is recommended that a range of bat boxes are incorporated within the site design. Ideally these would be placed on suitable mature trees on the site's periphery. The bat boxes should be mounted at least 3m from the ground and on south, east and west aspects. The bat boxes should be a variety of designs to encourage different environmental conditions and to be suitable for a range of species. Any external lighting will be applied sensitively with no lights above or adjacent to access points on bat boxes."

Biodiversity Enhancement and Management Plan (March 2023)

2.18 The appointed Ecologist has produced the Biodiversity Enhancement and Management Plan (BEMP) to discharge the outstanding ecological planning conditions at the Site.

2.19 Dark corridors have been recommended along the northern, eastern, southern and western Site boundaries as well as no lighting proposed within the areas of open public space.

2.20 Two further dark corridors running across the central area of the Site as part of retained hedgerows from north to south have also been recommended.

Areas of sensitive ecology

2.21 **Figure 1** is a consolidated plan which indicates areas of sensitive ecology as provided within the Ecology Appraisal and from correspondence with the appointed Ecologist.

2.22 While not indicated within the Ecology Appraisal report, Tree T1 is identified as a tree with bat potential on the Habitat Plan, as well as Tree T2.

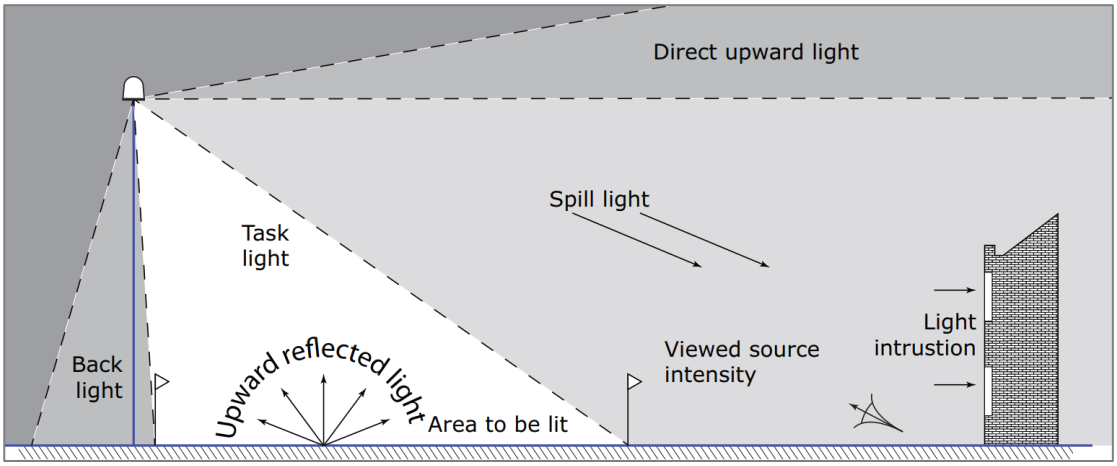
Figure 1. Areas of sensitive ecology



3. LIGHT POLLUTION

3.1 Light pollution is a generic term for all the adverse impacts that artificial lighting can have after dark. The main types of light pollution are shown diagrammatically in **Figure 2**.

Figure 2. Types of Light Pollution



3.2 Contributing to these direct effects are three design aspects that should be considered alongside the purpose for a new lighting installation and the type of sensitive receptors found in the local area. These are described later in this report.

Types of Light Pollution

Light Spill (Light intrusion, back light)

3.3 Light spill is 'the spilling of light beyond the boundary of the site on which a light source is located', such that it causes a noticeably adverse effect. More simply, light spill is often termed as the intrusion of light into homes. It can also have a negative effect on wildlife and ecological systems local to an installation.

3.4 As set out in the ILP Guidance Notes, the limits for light spill vary according to the environmental zone of the existing location and have been set to encourage appropriate lighting design. Through careful design, it can readily be ensured that this impact is prevented and that the illumination falling within any residential property can be reduced to zero. This is incorporated into the Lighting Strategy contained within this report.

Sky Glow (Direct upward light)

3.5 Sky glow is the 'the brightening of the night sky' above illuminated areas. The brightness created is constantly varying as a function of many parameters such as direct upward-lighting, ground surface reflectance, overhead cloud cover, and the degree of water droplets in the atmosphere - rain, fog/mist, and snow, for example, exacerbate the effect.

3.6 Mitigation is achieved by complying with the recommended limits in the ILP Guidance Notes for upward light emission. The limits vary according to the environmental zone of

the existing location and have been set to encourage appropriate lighting design. The Lighting Strategy will ensure that these limits can be met for the Proposed Development.

3.7 To mitigate sky glow as much as possible, lighting must be accurately targeted and kept to a minimum, and this design principle is incorporated into the Lighting Strategy.

3.8 The magnitude of the impact is a matter of judgement, taking into account the existing night-time view. The magnitude is lessened for those views where an observer is subject to direct illumination from, say, a nearby streetlight, or where light spill from a nearby light source illuminates the foreground, because the observer's vision is not fully dark adapted.

Glare (Viewed source intensity)

3.9 Glare occurs when an individual experiences visual discomfort or disability stemming from direct views of lamp sources, or high contrast of a lighting installation against a dark background. The placement of luminaires, their photometric characteristics, and the viewing context contribute to glare, which has been noted to result from uncontrolled private lighting installations, security lighting, street lighting mounted at high level near residences or habitat.

Design Aspects

Building Luminance

3.10 This considers the appropriateness and scale of brightness for the lighting / highlighting of built structures. Design criteria is included within ILP guidance notes as more of a main effect. While this is addressed independently, building luminance can also be considered as an indirect contributor to light spill, sky glow and glare.

Light Levels

3.11 Light levels, both as designed and installed, have the potential to create areas which have a noticeable difference in brightness. A new lighting installation in an area that has not been lit or is significantly brighter than the surrounding area may affect both adjacent receptors in the form of light spill or glare, and those over a larger area by contributing to sky glow through over-lighting.

Light Colour

3.12 Light colour has the potential to alter an individual's perception of their environment with respect to colour and clarity, as the human eye responds best to whiter light with higher quantities of ultraviolet wavelengths. Various wildlife species may respond differently to spectral composition depending on how reliant they are on darkness; many nocturnal animals continue their social habits and feeding behaviours with increased activity in the area while others may decrease their activity and possibly desert their habitat. This type of impact could affect pedestrians, vehicle operators and wildlife, and is likely to occur where new lighting is placed.

Example Lux Levels

3.13 To give context to the lux levels mentioned to within this report, **Table 5** provides examples of typical lux levels in various scenarios and applications.

Table 5. Example lux levels

Lighting Condition	Lux level
British summer sunshine	50,000
Overcast sky	5,000
Well-lit office	500
Minimum for easy reading	300
Passageway / outside working area	250
Main road lighting	5-20
Sunset	10
Typical side road lighting	5
Minimum security lighting	2
Twilight	1
Clear full moon	0.25 to <1
Typical moonlight / cloudy sky	0.1
Typical starlight	0.001
Poor starlight	0.0001

Source: IPCCTV specialists use-IP Ltd

4. BASELINE

4.1 This section provides a review of the existing conditions at the site. The review is based on a desktop study using Google Earth satellite and street view imagery.

4.2 The Site is accessed from the north off Hay Green Lane and comprises arable fields and hedgerows. The Site does not currently contain any sources of artificial lighting.

4.3 The Site is bound to the north by residential properties with Hay Green Lane beyond which is provided with assumed 6m high LED type street lighting columns. The Site is bound to the south and east by trees and hedges. The Site is bound to the west by residential properties with the A61 Sheffield Road beyond which is provided with assumed 8m high LED type street lighting columns.

4.4 **Figure 3** shows an aerial view of the proposed site.

Figure 3. Aerial view of site



Environmental Zone

4.5 Following the desktop study, it was concluded that the development is in a rural location and the proposed development site should be classified as 'Environmental Zone E2 – Low district brightness area, in accordance with the ILP guidance limits outlined within **Table 1**. Therefore, with reference to **Table 2**, the worst case permitted light trespass limit at an offsite receptor in the pre-curfew period (typically considered to be 07:00-23:00) is 5 Lux and in the post curfew period (typically considered to be 23:00-07:00) is 1 Lux. The maximum upward light ratio (ULR) is 2.5%.

5. PROPOSED DEVELOPMENT

Proposed Site Lighting

5.1 A lighting design strategy has been prepared that reflects:

- Environmental requirements and the applicable guidance / standards.
- Local Authority requirements.
- Technical requirements and the applicable guidance / standards; and
- Appropriate selection of lighting typologies to suite the above.

5.2 The proposed lighting design comprises high quality 3m and 6m high column mounted LED luminaires, equipped with specific optics to maximum useful light and minimise wasteful light.

5.3 The proposed luminaires are warm white 2700K colour temperature in line with the recommendations of Institute of Lighting Professionals (ILP) Guidance Note 08 for Bats and artificial lighting in the UK (2018) and the recommendations of the appointed Ecologist.

5.4 The proposed luminaires have been designed to achieve the target lighting illuminance and uniformity at full cut-off, at 0° tilt.

5.5 Illumination has been proposed to meet the recommendations of BS 5489-1 and BS EN 13201-2. The design has been produced to provide illumination at Lighting Class P5 (3.0 Lux average, 0.60 Lux minimum), for a residential road in an E2 environmental zone as defined in **Table 3** and **4**.

5.6 The lighting design layout is included in **Appendix 2**. The lighting lux plot layout is included in **Appendix 3.** Literature from the manufacturer of the proposed luminaire types is included in **Appendix 4**.

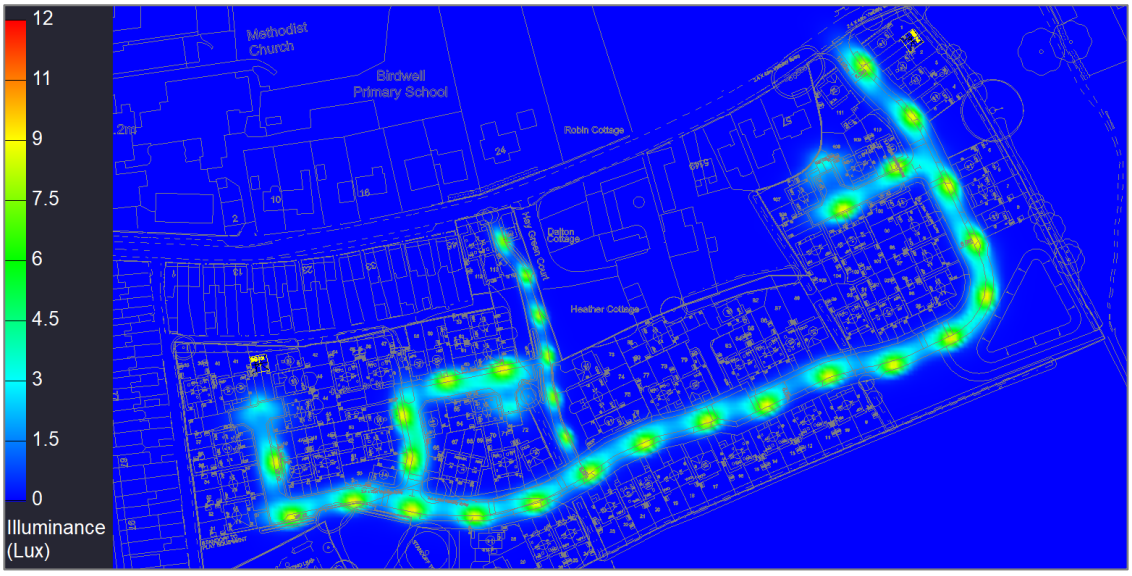
5.7 **Table 6** illustrates the design lighting levels meet target levels for Lighting Class P5.

Table 6. Proposed external lighting design levels

Area	Target		Design	
	Maintained Illuminance Em (Lux)	Minimum Illuminance Em (Lux)	Maintained Illuminance Em (Lux)	Minimum Illuminance Em (Lux)
Connecting footpath	3.00	0.60	3.88	1.0
Roads	3.00	0.60	3.38	0.8

5.8 **Figure 4** is a false colour render which has been taken from the design model and provides an overview of the proposed light distribution. The render is graduated on the illuminance scale shown.

Figure 4. False colour render



Upward light ratio (ULR)

5.9 The design has been used to calculate the predicted ULR of the proposed external lighting scheme. Model outputs predict a ULR of 0.0%. As illustrated in **Table 2**, the ILP sky glow limitation for an area classified as Environmental Zone E2 is 2.5% ULR. As such the proposed lighting scheme meets the ILP sky glow limitations and is therefore not considered to result in unacceptable impacts on the dark sky landscape.

Light spill

5.10 The lux plot layout, included in **Appendix 3,** has been produced in industry standard lighting calculation software. The lux plot assumes a level, clear site. In practice, the effect of changes in elevation and obstructions such as trees and hedges will contain the light spill further than is shown in the plot, i.e. this Lux plot represents the absolute worst case scenario.

5.11 The mounting height for luminaires illuminating the road areas has been limited to a maximum of 6m. The mounting height for luminaires illuminating the connecting footpath has been limited to a maximum of 3m. Limiting column heights helps to reduce the impact on the daytime setting and provides a dark corridor above the luminaire height.

5.12 The proposed luminaires are equipped with optics specific to each area which minimises the distribution of light outside of the site boundary as far as practicable. Where necessary, a specific luminaire optic with extreme cut-off has been utilised at boundaries as highlighted by the appointed Ecologist to keep light spill to an absolute minimum.

5.13 Vertical calculation surfaces have been included to simulate obtrusive light on local properties on Hay Green Lane and A61 Sheffield Road. The calculations shows a maximum of 0.07 Lux vertical illumination which, with reference to **Table 5**, is comparable to moonlight. As illustrated in **Table 2**, the ILP obtrusive light limitation for an area classified as environmental zone E2 is 5 Lux pre-curfew and 1 Lux post-curfew. As

such the proposed lighting scheme meets the ILP obtrusive light limitations and is therefore not considered to result in unacceptable impacts on residential properties.

Ecology measures

5.14 The proposed external lighting design has been prepared in accordance with the Ecological Appraisal (May 2020) and the Biodiversity Enhancement and Management Plan (March 2023).

5.15 To protect the ecological value of the Site, the appointed Ecologist has recommended that the design should be produced in accordance with the recommendations of the ILP BCT Guidance Note 08 for Bats and artificial lighting in the UK (2018):

- All luminaires lack UV elements when manufactured.
- LED luminaires have been used.
- A warm white spectrum has been used.
- Luminaires feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Column heights have been minimised to minimise light spill.
- Luminaires with an upward light ratio 0% have been proposed.
- Good optical control has been used.
- All luminaires are mounted on the horizontal, i.e no upward tilt.

5.16 Direct illumination of existing trees, scrub woodland, or proposed areas of habitat creation / landscape planting, including trees T1 and T2, has been avoided. Vertical calculation surfaces have been included to simulate light on both trees. The calculations shows a maximum of 0.02 Lux vertical illumination on Tree T1, and 0.19 Lux on Tree T2 which, with reference to **Table 5,** is less than light produced by a clear full moon.

5.17 All luminaires are fitted with flat glass components to minimise upward light.

5.18 Specific optics have been utilised to keep light spill to an absolute minimum.

5.19 Dimming factors have been applied to the luminaires to avoid over lighting.

5.20 The external lighting design has been reviewed and subsequently approved by the appointed Ecologist.

5.21 Dark corridors have been provided around all perimeters of the site as far as practicable. Two additional dark corridors have been provided running north to south. The first corridor remains unlit. The second corridor is proposed to become a footpath which connects the Site to Hay Green Lane. Illumination of this footpath is proposed via shorter 3m columns to create a dark corridor above.

5.22 During the detailed design phase of the project, the locations of the proposed bat boxes shall be coordinated with the locations of the proposed lighting columns. The appointed Ecologist must be consulted prior to any onsite installation.

6. RECOMMENDATIONS

6.1 All external lighting, whether for the construction, or operation, must comply with the recommended limitations given in the ILP Guidance Notes for an Environmental Zone E2 location. The limits, set out in **Table 2**, prohibits excessive emission of upward light and helps to minimise light spill and glare.

6.2 Light colour should be addressed as part of the overall approach to the masterplan lighting design. Warmer light colour is preferred in accordance with accordance to Institute of Lighting Professionals (ILP) Guidance Note 08 for Bats and artificial lighting in the UK (2018). LED typically features no UV component and research indicates that while lower UV components attract fewer invertebrates, warmer colour temperatures cause less impacts on bats.

6.3 Spectral composition is somewhat related to light colour, but the effects are not always immediately apparent. It is desirable for light quality, safety and wildlife effect limitation purposes to use LED technology. LEDs present good working efficacy, a smaller light emitting area which is good for light control and spectral compositions which are less disturbing to nocturnal wildlife or their food sources than UV rich traditional light sources.

6.4 The use of horizontal cut-off luminaires installed at zero tilt with flat glass lenses and internal optics is recommended to limit views of the lamp, control glare and direct light in a controlled pattern. This will help to minimise potential glare, sky glow and light spill.

6.5 New generation LED light sources are recommended for new external lighting.

6.6 Wattages shall achieve required light levels without over-lighting.

6.7 During the detailed design phase of the project, the locations of the proposed bat boxes shall be coordinated with the locations of the proposed lighting columns. The appointed Ecologist must be consulted prior to any onsite installation.

6.8 The final detailed design may deviate from the indicative external lighting design presented but must meet all parameters and criteria as set out in this report and demonstrate equal to or less than the quantity of light spill achieved. An adequate and safe level of lighting must be provided for site tasks, amenity, and security, whilst maintaining acceptable impact on the site surroundings, ecology, and neighbouring properties.

7. CONCLUSION

7.1 As part of the lighting strategy a review has been undertaken of the potential impact created by new lighting in relation to the proposed development.

7.2 Legislation, British standards, and good practice guidance recommends the development requires new exterior lighting for purposes of vehicular and pedestrian safety.

7.3 Potentially significant effects from the proposed lighting on sensitive receptors can be managed to create a negligible night-time impact.

7.4 The lighting design strategy presented indicates the potential significant effects from new lighting for the proposed development can be adequately managed and all tested parameters are expected to meet recommended guidance benchmarks.

7.5 The lighting design strategy presented indicates the proposed lighting installation can achieve the required minimum lighting levels and distribution to meet the applicable standards while causing negligible light trespass to the adjoining land and negligible increase in local sky glow.

7.6 The final detailed design may deviate from the indicative external lighting design presented but must meet all parameters and criteria as set out in this report and demonstrate equal to or less than the quantity of light spill achieved. An adequate and safe level of lighting must be provided for site tasks, amenity, and security, whilst maintaining acceptable impact on the site surroundings, ecology, and neighbouring properties.

7.7 The lighting design has been reviewed and subsequently approved by the appointed Ecologist.

7.8 The most noticeable effect due to the proposed street lighting installation expected to remain is a negligible increase in sky glow.

APPENDICES

Appendix 1: Proposed Development Masterplan

Methodist Church

Birdwell Primary School

Robin Cottage

Dalton Cottage

Heather Cottage

Hay Green Court

2.4 x 43m VISIBILITY SPLAYS IN EACH DIRECTION AT MAIN SITE ENTRANCE IN ACCORDANCE WITH DWG. NO. 18039.GA.02 APPROVED UNDER CONDITION 5 ON THE OUTLINE PLANNING PERMISSION

2.4 x 43m Visibility Splay

2.4 x 22m Visibility Splay

15.00m

6.0m

3.0M WIDE FOOTPATH / CYCLE LINK PROVIDED IN ACCORDANCE WITH DWG. NO. 18039.GA.01 APPROVED UNDER CONDITION 5 ON THE OUTLINE PLANNING PERMISSION FULL DETAILS TO AGREED AS PART OF THE SECTION 38 AGREEMENT AND TO MEET THE REQUIREMENTS OF LTN1/20 CYCLE INFRASTRUCTURE.

SECTION OF WALL ALONG SITEFRONTAGE TO BE REMOVED TO ALLOW THE IMPLEMENTATION OF A 3.0m WIDE FOOTPATH

HATCHED AREA DENOTES EXTENT OF ADOPTED HIGHWAY EXTENDS IN TO THE SITE AREA WHICH IS PROPOSED TO BE FENCED OFF AND FACILITATED AS INDICATED

LOW LEVEL FENCING TO ALLOW FOR MAINTENANCE OF EXISTING HEDGE

HEDGE TO BE CUT BACK TO SITE BOUNDARY

FOOTPATH / CYCLE CONNECTION

STANDOFF TO PLAY EQUIPMENT

EXISTING LEAP

EXISTING MUGA

PROPOSED NEAP

POS

SURFACE WATER ATTENUATION BASIN

3.0M WIDE FOOTPATH / CYCLE LINK PROVIDED IN ACCORDANCE WITH OUTLINE PLANNING PERMISSION FULL DETAILS TO AGREED AS PART OF THE SECTION 38 AGREEMENT AND TO MEET THE REQUIREMENTS OF LTN1/20 CYCLE INFRASTRUCTURE.

LOW LEVEL FENCING TO ALLOW FOR MAINTENANCE OF EXISTING HEDGE

AFFORDABLE HOUSING:		RENT	FIRST HOMES	TOTAL
ASKHAM	3No.	2 BED TERRACE @65.8 SQ.M	3No. (plots 35, 36 & 37)	3No.
ASKHAM	2No.	2 BED SEMI @65.8 SQ.M	2No. (Plots 24 & 25)	2No.
BAILDON	6No.	3 BED SEMI @ 90.5 SQ.M	4No. (Plots 26, 27, 54 & 55)	2No. (Plots 56 & 57)	6No.
TOTAL	11No.		7No.	4No.	11No.

House Type	Reference	Type	Parking	Storey	Bed	No
Affordable						
Askham	ASK	Semi/Townhouse	PS	2	2	5
Baildon	BAI	Semi/Townhouse	PS	2.5	3	6
						11
Open Market						
Askham	ASK	Semi/Townhouse	PS	2	2	13
Fernlee	FER	Semi	PS	2	2	4
Ripon	RIP	Semi	PS	2	2	18
Oakwood	OAK	Det	INT	2	3	6
Maltby	MAL	Det	SG	2	3	2
Leyburn	LAY	Det	PS / SG	2	3	10
Baildon	BAI	Semi	PS	2.5	3	25
Saltaire	SAL	Semi / Townhouse	PS	2.5	3	7
Netherton	NET	Det	SG	2.5	4	5
Horbury	HOR	Det	SG	2	4	3
Walburn	WAL	Det	INT	2.5	4	4
Cookridge	COO	Det	SG	2	4	5
						102

Overall Site Affordable Total	**11**
Overall Site Open Market Total	**102**
Overall Site Total	**113**

NOISE MITIGATION

ACOUSTIC TRICKLE VENTS TO HABITABLE ROOMS (32dB $D_{n,e,w}$)

NOTE: ALL PLOTS TO BE RECEIVE STANDARD DOUBLE GLAZING (4mm/16mm/4mm)

PLANNING KEY

PLANNING LAYOUT KEY:

- SITE BOUNDARY
- 1.8m TIMBER SCREEN FENCE
- 1.2m POST & RAIL FENCE
- 0.45m KNEE HIGH RAIL
- 1.8m SCREEN WALL & FENCE PANEL INFILL
- 1.8m TIMBER GATE
- EVCP
- BIN STORAGE
- BIN COLLECTION POINT
- SHED POINT
- AFFORDABLE PLOTS
- SWALE LOCATIONS
- EXISTING TREES AND HEDGING WITH RPA
- TREES AND HEDGING TO BE REMOVED
- STAND OFF TO EXISTING AND FUTURE PLAY EQUIPMENT

NOTE: REAR / SIDE BOUNDARY TREATMENT TO PLOTS WITH GARDEN BOUNDARIES ADJACENT TO EXISTING RETAINED HEDGEROW TO BE AS FOLLOWS:

EXISTING HEDGEROW TO BE CUT BACK WHERE POSSIBLE TO ALLOW 1.2m HIGH POST AND RAIL TO BE FITTED TIGHT UP TO THE HEDGE TO ALLOW FUTURE MAINTENANCE BY PLOT BUYERS.

REV	DATE	BY	AMENDMENTS

AVANT homes
Avant House, 6 and 9 Tallys End, Barbourough, Chesterfield, S43 4WP.
Tel: 01246 573790, Fax: 01246 573 741.
www.avanthomes.co.uk

DATE:	SCALE:	DRAWN BY:
Nov 2021	500 @ A1	RB.

DWG TITLE: PLANNING LAYOUT

PROJECT: Hay Green Lane, Birdwell

DWG No. 4203/04 REV: J

T:\Site\4203- Hay Green Lane, Birdwell, Barnsley\01 LANDISKETCH LAYOUT\Birdwell-Hay Green Lane - Planning Layout-Rev.J

Appendix 2: Proposed External Lighting Layout

Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

Key Plan

Legend

Rev	Date	Details of issue / revision	Drw	Rev
P1	13.03.23	Preliminary Issue	GCL	DA

Issues & Revisions

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- ■ Leeds | 0113 233 8000
- ☐ London | 020 7407 3879
- ☐ Manchester | 0161 233 4260
- ☐ Nottingham | 0115 924 1100

www.bwbconsulting.com

Client

Avant Homes

Project Title

Hay Green Lane
Birdwell

Drawing Title

Electrical Services
Proposed External Lighting Layout
Site Plan

Drawn:	G. C. Leeming		Reviewed:	D. Alasfar	
BWB Ref:	220746	Date:	07.03.23	Scale@A1:	1:500

Drawing Status

Information

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
HGL-BWB-00-XX-DR-E-2300	**S2**	**P1**



Luminaire Schedule

Symbol	Label	Qty	Arrangement	Description
	A1	24	Single	20.5w LED 2700k (1 module) 525mA Italo 1 with STE-M Optic dimmed to 50%
	A2	6	Single	20.5w LED 2700k (1 module) 525mA Italo 1 with STE-M Optic dimmed to 15%
	B	3	Single	16w LED 2700k (1 module) 525mA Italo 1 with S05 Optic dimmed to 50%

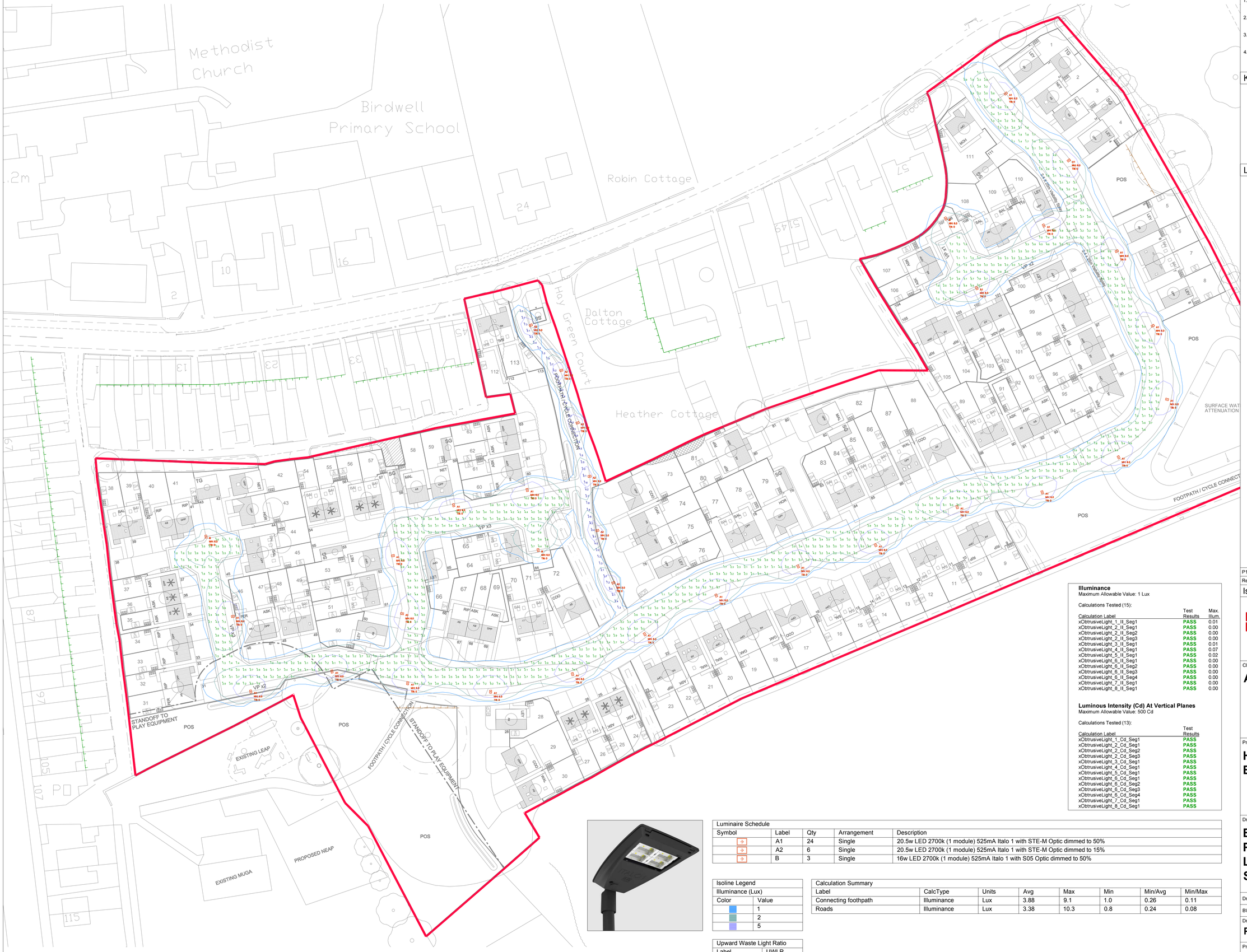
Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Min/Avg	Min/Max
Connecting foothpath	Illuminance	Lux	3.88	9.1	1.0	0.26	0.11
Roads	Illuminance	Lux	3.38	10.3	0.8	0.24	0.08

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Appendix 3: Proposed External Lux Plot Layout



Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

Key Plan

Legend

Illuminance
Maximum Allowable Value: 1 Lux

Calculations Tested (15):

Calculation Label	Test Results	Max. Illum.
xObtrusiveLight_1_Ill_Seg1	PASS	0.01
xObtrusiveLight_2_Ill_Seg1	PASS	0.00
xObtrusiveLight_2_Ill_Seg2	PASS	0.00
xObtrusiveLight_2_Ill_Seg3	PASS	0.00
xObtrusiveLight_3_Ill_Seg1	PASS	0.01
xObtrusiveLight_4_Ill_Seg1	PASS	0.07
xObtrusiveLight_5_Ill_Seg1	PASS	0.02
xObtrusiveLight_6_Ill_Seg1	PASS	0.00
xObtrusiveLight_6_Ill_Seg2	PASS	0.00
xObtrusiveLight_6_Ill_Seg3	PASS	0.00
xObtrusiveLight_6_Ill_Seg4	PASS	0.00
xObtrusiveLight_7_Ill_Seg1	PASS	0.00
xObtrusiveLight_8_Ill_Seg1	PASS	0.00

Luminous Intensity (Cd) At Vertical Planes
Maximum Allowable Value: 500 Cd

Calculations Tested (13):

Calculation Label	Test Results
xObtrusiveLight_1_Cd_Seg1	PASS
xObtrusiveLight_2_Cd_Seg1	PASS
xObtrusiveLight_2_Cd_Seg2	PASS
xObtrusiveLight_2_Cd_Seg3	PASS
xObtrusiveLight_3_Cd_Seg1	PASS
xObtrusiveLight_4_Cd_Seg1	PASS
xObtrusiveLight_5_Cd_Seg1	PASS
xObtrusiveLight_6_Cd_Seg1	PASS
xObtrusiveLight_6_Cd_Seg2	PASS
xObtrusiveLight_6_Cd_Seg3	PASS
xObtrusiveLight_6_Cd_Seg4	PASS
xObtrusiveLight_7_Cd_Seg1	PASS
xObtrusiveLight_8_Cd_Seg1	PASS

Luminaire Schedule

Symbol	Label	Qty	Arrangement	Description
	A1	24	Single	20.5w LED 2700k (1 module) 525mA Italo 1 with STE-M Optic dimmed to 50%
	A2	6	Single	20.5w LED 2700k (1 module) 525mA Italo 1 with STE-M Optic dimmed to 15%
	B	3	Single	16w LED 2700k (1 module) 525mA Italo 1 with S05 Optic dimmed to 50%

Isoline Legend
Illuminance (Lux)

Color	Value
	1
	2
	5

Upward Waste Light Ratio

Label	UWLR
Site	0.000

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Min/Avg	Min/Max
Connecting foothpath	Illuminance	Lux	3.88	9.1	1.0	0.26	0.11
Roads	Illuminance	Lux	3.38	10.3	0.8	0.24	0.08

Rev	Date	Details of issue / revision	Drw	Rev
P1	13.03.23	Preliminary Issue	GCL	DA

Issues & Revisions

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Manchester | 0161 233 4260
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Client
Avant Homes

Project Title
Hay Green Lane Birdwell

Drawing Title
Electrical Services Proposed External Lux Plot Layout Site Plan

Drawn:	G. C. Leeming	Reviewed:	D. Alasfar
BWB Ref:	220746	Date: 07.03.23	Scale@A1: 1:500

Drawing Status
PRELIMINARY

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
HGL-BWB-00-XX-DR-E-2301	S2	P1

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Appendix 4: Proposed Luminaire Type

Kingfisher Lighting

Datasheet



Italo

Product Description

The Italo offers high performance functionality and comes with a wide optic selection suitable for any street, pathway or car park application.

Specification Text

The luminaire shall be manufactured from high-pressure die-cast aluminium. It shall have an LED efficacy of up to 131.0 lm/W and will be capable of producing up to 15,130 luminaire lumens at 4000K with a CRI >70. It shall have an asymmetric forward throw optic and is rated at IP66 and IK09.

Specification

Weight: 7.0kg

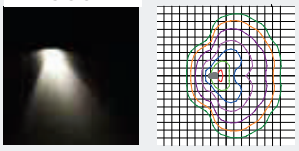
Windage: 0.06-0.18m²

Material: Die-cast Aluminium

Paint finish: Semi-Gloss Satin Grey

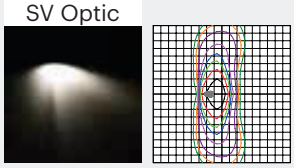
Optics

SO5



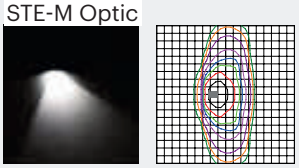
Asymmetrical optic suitable for street, urban and open area lighting

SV Optic



Asymmetrical narrow optic for lighting narrow urban streets and highway entrances and exits

STE-M Optic



Asymmetrical optic suitable for suburban areas

Key Features

- 15.0W - 146.0W
- 1,800 - 15,130 Luminaire Lumens
- Efficacy up to 131.0 lm/W
- 2700K, 3000K and 4000K, CRI >70
- Lifetime >100,000hr, L90
- Toolless Entry

AEC ILLUMINAZIONE

light life

LED | IP66 | IK09 | DIM | Control Compatible

Mounting Options

- 76mm Advised for Side Entry Fixing
- 76mm for Post Top as well as Side Entry

Other Options

- Colour Temperature Options
- Photocell Options
- Emergency Options
- Paint Finish Options

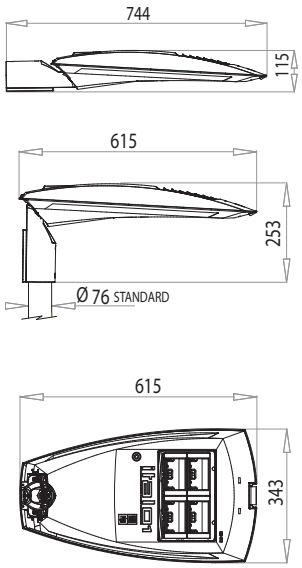
Contact for details

Code	Power	Luminaire Lumens	No. Modules	Drive Current	Optic	CCT(K)	IP	IK	Weight kg	Paint Finish	Driver Included	Driver Type
IT1-SO5-4.5-1M1F	15.0	1,800	1	525	Asymmetric Suburban Street Optic (SO5)	4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SO5-4.7-1M1F	21.5	2,420	1	700		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SO5-4.5-2M1F	30.5	3,690	2	525		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SO5-4.7-2M1F	40.0	4,720	2	700		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SO5-4.5-3M1F	44.0	5,530	3	525		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SO5-4.7-3M1F	58.0	7,030	3	700		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SO5-4.5-4M1F	57.0	7,150	4	525		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SO5-4.7-4M1F	76.0	8,990	4	700		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SO5-4.8-4M1F	93.0	10,380	4	850		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SO5-4.100-4M1F	146.0	15,130	4	1000		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SV-4.5-1M1F	15.0	1,800	1	525	Asymmetric Urban Street Optic (SV)	4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SV-4.7-1M1F	21.5	2,420	1	700		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SV-4.5-2M1F	30.5	3,690	2	525		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SV-4.7-2M1F	40.0	4,720	2	700		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SV-4.5-3M1F	44.0	5,530	3	525		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SV-4.7-3M1F	58.0	7,030	3	700		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SV-4.5-4M1F	57.0	7,150	4	525		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-SV-4.7-4M1F	76.0	8,990	4	700		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI

Code	Power	Luminaire Lumens	No. Modules	Drive Current	Optic	CCT(K)	IP	IK	Weight kg	Paint Finish	Driver Included	Driver Type
IT1-STE-M-4.5-1M1F	20.5	2,610	1	525	Asymmetric Suburban Street Optic (STE-M)	4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-STE-M-4.7-1M1F	28.0	3,270	1	700		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-STE-M-4.5-2M1F	39.0	5,160	2	525		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-STE-M-4.7-2M1F	52.0	6,530	2	700		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-STE-M-4.5-3M1F	57.0	7,490	3	525		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-STE-M-4.7-3M1F	76.0	9,420	3	700		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-STE-M-4.5-4M1F	76.0	9,950	4	525		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI
IT1-STE-M-4.7-4M1F	102.0	12,550	4	700		4000	IP66	IK09	7.0	Semi-Gloss Satin Grey	Driver Inc	DALI



Dimensions








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